

**Claims:**

1. A tubing expansion tool comprising:  
a body; and  
at least one expansion member radially movably mounted on the body for movement towards an extended configuration describing an expansion diameter for expanding tubing to a predetermined diameter, the expansion member being lockable in the extended configuration.
2. A tool as claimed in claim 1, wherein the expansion member is mechanically lockable in the extended configuration.
3. A tool as claimed in claim 1, wherein the expansion member is hydraulically lockable in the extended configuration.
4. A tool as claimed in claim 1, wherein the expansion member is electro-mechanically lockable in the extended configuration.
5. A tool as claimed in claim 1, further comprising a locking assembly for locking the expansion member in the extended configuration.
6. A tool as claimed in claim 1, further comprising an activating member for moving the expansion member towards the extended configuration.
7. A tool as claimed in claim 6, wherein the activating member is moveable between a deactivating position and an activating position, in the activating position the activating member maintaining the expansion member in the extended configuration.

PATENT

Attorney Docket No.: MRKS/0099

Express Mail No.: EV 351031230 US

8. A tool as claimed in claim 7, wherein the activating member is lockable in the activating position, to lock the expansion member in the extended configuration.
9. A tool as claimed in claim 8, further comprising a locking assembly including a locking member adapted to engage the activating member when the activating member is in the activating position, to restrain the activating member.
10. A tool as claimed in claim 8, further comprising a locking assembly including a locking member coupled to the activating member and adapted to engage the tool body when the activating member is in the activating position, to restrain the activating member.
11. A tool as claimed in claim 1, wherein the expansion member is directly lockable in the extended configuration.
12. A tool as claimed in claim 11, further comprising a locking assembly including a locking member adapted to engage the expansion member when the expansion member is in the extended configuration.
13. A tool as claimed in claim 11, further comprising a locking assembly including a locking member coupled to the expansion member and adapted to engage the tool body.
14. A tubing expansion tool comprising:  
a body; and  
at least one expansion member radially movably mounted on the body for movement between a retracted configuration and an extended configuration

describing an expansion diameter for expanding tubing, the expansion member being biased radially inwardly.

15. A tool as claimed in claim 14, further comprising a biasing assembly for biasing the expansion member radially inwardly.

16. A tool as claimed in claim 15, wherein the biasing assembly comprises a mechanical biasing member.

17. A tool as claimed in claim 16, wherein the biasing assembly includes a biasing spring.

18. A tool as claimed in claim 15, wherein the biasing assembly comprises an electro-mechanical assembly.

19. A tool as claimed in claim 15, wherein the biasing assembly comprises a hydraulic assembly.

20. A tool as claimed in claim 14, further comprising an activating member for moving the expansion member towards the extended configuration.

21. A tool as claimed in claim 20, wherein the activating member is moveable between a deactivating position and an activating position, in the activating position

the activating member maintaining the expansion member in the extended configuration.

22. A tool as claimed in claim 21, wherein the activating member is biased towards the deactivating position.

23. A tool as claimed in claim 15, wherein the biasing assembly directly biases the expansion member radially inwardly.

24. A tubing expansion tool comprising:

a body;

at least one expansion member radially movably mounted on the body for movement towards an extended configuration describing an expansion diameter for expanding tubing, the expansion member being moveable in response to both:

an applied mechanical force; and

an applied fluid pressure force.

25. A tool as claimed in claim 24, wherein the expansion member is moveable by an activating assembly including an activating member for moving the expansion member towards the extended configuration.

26. A tool as claimed in claim 25, wherein the activating member is moveable between a deactivating position and an activating position, in the activating position,

the activating member maintaining the expansion member in the extended configuration.

27. A tool as claimed in claim 25, wherein the activating member is moveable in response to either an applied mechanical force, an applied fluid pressure force, or a combination of the two.

28. A tool as claimed in claim 25, wherein the activating assembly includes a first activating member moveable in response to an applied mechanical force and a second activating member moveable in response to a fluid pressure force.

29. A tool as claimed in claim 28, wherein the first and second activating members are associated with separate expansion members.

30. A tool as claimed in claim 25, wherein the activating member comprises a mandrel.

31. A tool as claimed in claim 25, wherein the activating member comprises a piston.

32. A tool as claimed in claim 6, wherein the activating member includes a cam surface for urging the expansion member to the expanded configuration.

PATENT

Attorney Docket No.: MRKS/0099

Express Mail No.: EV 351031230 US

33. A tool as claimed in claim 20, wherein the activating member includes a cam surface for urging the expansion member to the expanded configuration.

34. A tool as claimed in claim 25, wherein the activating member includes a cam surface for urging the expansion member to the expanded configuration.

35. A tool as claimed in claim 1, wherein, in use, the expansion member describes an unexpanded diameter less than an unexpanded inner diameter of the tubing.

36. A tool as claimed in claim 14, wherein, in use, the expansion member describes an unexpanded diameter less than an unexpanded inner diameter of the tubing.

37. A tool as claimed in claim 24, wherein, in use, the expansion member describes an unexpanded diameter less than an unexpanded inner diameter of the tubing.

38. A tool as claimed in claim 1, wherein, in use, the expansion member describes an unexpanded diameter greater than the unexpanded inner diameter of the tubing.

39. A tool as claimed in claim 14, wherein, in use, the expansion member describes an unexpanded diameter greater than the unexpanded inner diameter of the tubing.

40. A tool as claimed in claim 24, wherein, in use, the expansion member describes an unexpanded diameter greater than the unexpanded inner diameter of the tubing.

41. A tool as claimed in claim 1, wherein the expansion member is pivotable relative to the body.

42. A tool as claimed in claim 41, wherein the expansion member is pivotably mounted to the body.

43. A tool as claimed in claim 42, further comprising an arm pivotably mounted to the body, the expansion member mounted for rotation with respect to the arm.

44. A tool as claimed in claim 1, wherein the tool is a downhole tool for expanding downhole tubing.

45. A tool as claimed in claim 14, wherein the tool is a downhole tool for expanding downhole tubing.

PATENT

Attorney Docket No.: MRKS/0099

Express Mail No.: EV 351031230 US

46. A tool as claimed in claim 24, wherein the tool is a downhole tool for expanding downhole tubing.

47. A tool as claimed in claim 1, wherein the expansion member is rotatable about an expansion member axis, and wherein the expansion member axis is inclined with respect to the body of the tool.

48. A tool as claimed in claim 14, wherein the expansion member is rotatable about an expansion member axis, and wherein the expansion member axis is inclined with respect to the body of the tool.

49. A tool as claimed in claim 24, wherein the expansion member is rotatable about an expansion member axis, and wherein the expansion member axis is inclined with respect to the body of the tool.

50. A tool as claimed in claim 47, wherein the expansion member axis is inclined towards a leading end of the tool.

51. A tool as claimed in claim 48, wherein the expansion member axis is inclined towards a leading end of the tool.

52. A tool as claimed in claim 49, wherein the expansion member axis is inclined towards a leading end of the tool.



53. A tubing expansion tool comprising:  
a body; and  
at least one expansion member pivotably mounted with respect to the body  
for movement towards an extended configuration describing an expansion diameter  
for expanding tubing to a predetermined diameter.
54. A method of expanding tubing, the method comprising the steps of:  
providing a tubing expansion tool comprising a body and at least one  
expansion member movably mounted on the body;  
moving the expansion member radially outwardly to an extended  
configuration describing an expansion diameter;  
locking the expansion member in the extended configuration; and  
moving the expansion tool through tubing to be expanded.
55. A method as claimed in claim 52, wherein the expansion member is released  
from the extended configuration after removal of the tool from the tubing.
56. A method as claimed in claim 52, wherein the expansion member is released  
from the extended configuration whilst the tool is in the tubing.
57. A method of expanding tubing, the method comprising the steps of:  
providing a tubing expansion tool comprising a body and at least one  
expansion member movably mounted on the body; and

moving the expansion member radially outwardly to an extended configuration describing an expansion diameter against a biasing force which biases the expansion member radially inwardly.

58. A method as claimed in claim 57, wherein the biasing force acts directly on the expansion member to urge the expansion member radially inwardly.

59. A method as claimed in claim 57, wherein the expansion member is moved to the extended configuration by moving an activating member from a deactivating to an activating position, and wherein the biasing force urges the activating member towards the deactivating position.

60. A method of expanding tubing, the method comprising the steps of:

providing a tubing expansion tool comprising a body and at least one expansion member radially movably mounted on the body for movement towards an extended configuration describing an expansion diameter;

moving the expansion member to the extended configuration in response to a selected one or both of an applied mechanical force and an applied fluid pressure force; and

moving the expansion tool through the tubing to diametrically expand the tubing.

61. A method as claimed in claim 60, further comprising applying a mechanical force by applying weight to the tool.

62. A method as claimed in claim 60, further comprising applying a fluid pressure force by circulating fluid through the tool.

63. A method as claimed in claim 60, further comprising applying a fluid pressure force by supplying hydraulic fluid to the tool.

64. A method as claimed in claim 54, further comprising:  
translating the tool through a restriction defining an internal bore diameter smaller than said expansion member expansion diameter; and then  
moving the expansion member radially outwardly to said extended configuration.

65. A method as claimed in claim 57, further comprising:  
translating the tool through a restriction defining an internal bore diameter smaller than said expansion member expansion diameter; and then  
moving the expansion member radially outwardly to said extended configuration.

66. A method as claimed in claim 60, further comprising:  
translating the tool through a restriction defining an internal bore diameter smaller than said expansion member expansion diameter; and then  
moving the expansion member radially outwardly to said extended configuration.

67. A method as claimed in claim 64, comprising translating the tool through a restriction in an unlined portion of a borehole.

68. A method as claimed in claim 65, comprising translating the tool through a restriction in an unlined portion of a borehole.

69. A method as claimed in claim 66, comprising translating the tool through a restriction in an unlined portion of a borehole.

70. A method as claimed in claim 64, comprising translating the tool through a restriction in the tubing.

71. A method as claimed in claim 65, comprising translating the tool through a restriction in the tubing.

72. A method as claimed in claim 66, comprising translating the tool through a restriction in the tubing.

73. A method as claimed in claim 54, comprising expanding an end of the tubing to a greater diameter than a remainder of the tubing.

74. A method as claimed in claim 73, comprising forming a bell-bottom in the tubing.

75. A method as claimed in claim 73, further comprising locating a further tubing in said end of the tubing.

76. A method as claimed in claim 57, comprising expanding an end of the tubing to a greater diameter than a remainder of the tubing.

77. A method as claimed in claim 76, comprising forming a bell-bottom in the tubing.

78. A method as claimed in claim 60, comprising expanding an end of the tubing to a greater diameter than a remainder of the tubing.

79. A method as claimed in claim 78, comprising forming a bell-bottom in the tubing.